

REMARKS/ARGUMENTS

Reconsideration of this application is requested. Claims 1-6 and 8-14 are pending in the application subsequent to entry of this Amendment.

Amendments to the Claims

The claims have been amended in order to more particularly point out and distinctly claim that which applicants regard as their invention, to resolve issues, to direct them to preferred aspects of the disclosure and to facilitate further examination generally.

The definition of claim 7, the polybutylene terephthalate has an end methoxycarbonyl group concentration of not more than 0.5 $\mu\text{eq/g}$ is incorporated into claim 1. This is supported on paragraph [0056] of the US specification with the subject matter of claim 7 incorporated into claim 1, the rejections stated on pages 3, 5 and 7 of the Action are moot.

In claim 13, the upper limit of "increase in said end carboxyl end group concentration except for that due to a hydrolysis reaction of the polybutylene terephthalate" has been reduced from 30 $\mu\text{eq/g}$ to 20 $\mu\text{eq/g}$. This is supported on paragraph [0059] of the US specification.

Responsive to the examiner's objection, the Abstract has been shortened by removing the second sentence and presenting it in the form of a single paragraph.

Response to Remaining Prior Art-Based Rejections

The remaining rejections in the Action are addressed in the following remarks discussing each of the citations individually (they are not applied in combination).

As to JP 08-041182 (Kidai):

The present invention overlaps with JP 08-041182 in the description of polybutylene terephthalate which is obtained by use of a titanium compound and a magnesium compound as the catalyst has an end carboxyl group concentration of 20 $\mu\text{eq/g}$ or less and an intrinsic viscosity of 0.7 to 1.0 dL/g. Applicants note that although the Examiner points out that the 17 eq/t, 8 eq/t and 17 eq/t of the end carboxyl group concentration are described in the Examples and Comparative Examples of JP 08-041182, these values should be reducing the number of end carboxyl groups after solid state polymerization (= the difference of the number of end carboxyl group before/after solid state polymerization) with this adjustment in mind the correct end carboxyl group concentrations after solid state polymerization are 10 eq/t (Example 1), 45 eq/t (Comparative Example 1) and 23 eq/t (Comparative Example 2). Therefore, only the PBT

obtained in Example 1 of JP 08-041182 satisfies the scope of present invention before the present amendment.

However, in JP 08-041182, there is no description nor suggestion of the present amended end methoxycarbonyl group concentration (not more than 0.5 $\mu\text{eq/g}$). As described in paragraph [0065] of the present specification, in the case where dimethyl terephthalate is used as the raw material, the amount of such residual end methoxycarbonyl groups tends to be increased. Paragraph [0013] of JP 08-041182 states dimethyl terephthalate as lower alkyl ester components of bifunctional carboxylic acid, and dimethyl terephthalate was used in Examples and Comparative Examples of JP 08-041182.

In the present invention, the all end methoxycarbonyl group concentrations in Examples are not more than 0.1 $\mu\text{eq/g}$, in contrast, in Comparative Example 3 using dimethyl terephthalate as the raw material, the end methoxycarbonyl group concentrations was 1.5 $\mu\text{eq/g}$. The Examiner states that the end methoxycarbonyl group concentration in JP 08-041182 satisfies the present claimed range. However, for the above reasons, Applicant believes that the end methoxycarbonyl group concentration in JP 08-041182 does not satisfy the presently claimed range.

In the present invention, since the end methoxycarbonyl group concentration is quite low, at the polymerization, generation of toxic compounds such as methanol, formaldehyde or formic acid can be prevented. Therefore, the polybutylene terephthalate according to the present invention can be suitably used for food applications because of the reduction of those toxic compounds and damage caused by formic acid to metal molding apparatuses and vacuum-relating apparatuses attached thereto can be effectively reduced. These technical effects are fully described in paragraph [0065] of the present specification. Therefore, the present invention is not obvious from JP 08-041182.

As to US 2003/0069339 (Takenaka):

US 2003/0069339 states that catalysts usable for polymerization are exemplified many catalysts including titanium compounds, magnesium compounds and calcium compounds and two or more of these catalysts may be used in combination (refer to paragraphs [0083]-[0085]). However, in US 2003/0069339, there is no concrete description nor Examples using two catalysts of titanium compound and compound containing metal of Group 2A of the Periodic

Table in combination. Therefore, in US 2003/0069339, there is no direct description of using titanium compound and compound containing metal of Group 2A of the Periodic Table in combination as the catalyst as specified in applicant's claims.

Further, paragraph [0069] of US 2003/0069339 states that the amount of carboxyl end groups of the polybutylene terephthalate resin is 30 eq/t (30 $\mu\text{eq/g}$) or less and preferably 25 eq/t (20 $\mu\text{eq/g}$) or less. However, the best mode amount of carboxyl end groups in the Examples of US 2003/0069339 is 20 $\mu\text{eq/g}$ and this value is out of scope of original claim 1 (0.1 to 18 $\mu\text{eq/g}$) as well as amended claim 1. Therefore, in US 2003/0069339, there is no description of polybutylene terephthalate according to the present claim 1.

Accordingly, US 2003/0069339, provides no description of polybutylene terephthalate which is produced by the use of the above defined catalyst and has the above defined end carboxyl group concentration according to the amended claim 1 as well as the original claim 1.

Generally, it is known that when the end carboxyl group concentration is large, the resultant polybutylene terephthalate tends to exhibit deteriorated hydrolysis resistance (refer to paragraphs [0003] and [0031] of the present specification and paragraph [0005] of US 2003/0069339). Therefore, in view of providing a polybutylene terephthalate excellent in hydrolysis resistance, both the present invention and US 2003/0069339 have the same object (refer to paragraph [0007] of the present specification and paragraph [0002] of US 2003/0069339). However, although the points of present invention and US 2003/0069339 observations that the end carboxyl group concentration is lowered are equal in order to enhance hydrolysis resistance, the means to solve the objective of the present invention is completely different from that in US 2003/0069339. Namely, in the present invention, a titanium compound and compound containing metal of Group 2A of the Periodic Table in combination are used as the catalyst (refer to paragraph [0008] of the present specification). On the other hand, US 2003/0069339 takes a different approach -- it lowers the reaction temperature and shortens the reaction time (refer to paragraph [0008] of US 2003/0069339). Therefore, the means used to achieve a similar result are completely different. Also, US 2003/0069339, contains no description nor suggestion that the end carboxyl group concentration can be lowered by the type of catalyst used, and, as described above, many compounds usable for polymerization catalyst are merely listed in parallel.

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Therefore, the present invention is different from the invention of US 2003/0069339. Even though they both share the objective of improving hydrolysis resistance, it is clearly apparent that in the polybutylene terephthalate according to the present invention, especially excellent technical effects can be attained by use of the above specific combination of catalyst which is not described nor suggested in US 2003/0069339.

Reconsideration and favorable action are solicited.

The Commissioner is hereby authorized to charge any deficiency, or credit any overpayment, in the fee(s) filed, or asserted to be filed, or which should have been filed herewith (or with any paper hereafter filed in this application by this firm) to our Deposit Account No. 14-1140.

Respectfully submitted,

NIXON & VANDERHYE P.C.

By: /Arthur R. Crawford/
Arthur R. Crawford
Reg. No. 25,327

ARC:eaw
901 North Glebe Road, 11th Floor
Arlington, VA 22203-1808
Telephone: (703) 816-4000
Facsimile: (703) 816-4100